Retention of the Best Science and Engineering Graduates in Science and Engineering

Division of Science Resources Studies
Directorate for Social, Behavioral and Economic Sciences

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RETENTION OF THE BEST SCIENCE AND ENGINEERING GRADUATES IN SCIENCE AND ENGINEERING

Developing and maintaining students' skills in science and engineering has long been an important priority in U.S. education. For example, the National Education Goals call for U.S. students to be first in the world in science and mathematics. The goal to develop science and engineering (S&E) skills has several motivations. Some reasons are specifically tied to the economy, based on the assumption that America's competitive strength in the world economy depends in part on its science resources, while others are more general, such as the fact that voters may need information about science in order to develop informed positions about many important public policy issues (e.g., technology and the environment).

At the same time, the U.S. economy and education system are facing a mixed situation with regard to the need for technical and scientific skills. Some skills are greatly in demand, to the point where businesses often choose to locate in areas where there will be trained personnel. In other areas, there has been concern over an oversupply of Ph.D. scientists. Identifying current and future supplies of scientists and engineers is extremely difficult: predictions of an oversupply in the 1970s did not come true, and predictions of shortages in the late 1980s also failed to occur.[1] What is clear is that S&E positions are in a state of flux. The share of recent science and engineering graduates taking academic and government positions is decreasing, while there is great growth in business and industry. The proportion of science and engineering doctoral recipients who were employed in business and industry 5-8 years after graduation grew from 26 percent in 1973 to 45 percent in 1991.[2] Among those without doctorates, the proportion employed in private for-profit companies is even greater; that is, for 1995 it was 72 percent of those with bachelor's S&E degrees and 59 percent of those with master's S&E degrees.[3]

This paper examines the employment and education patterns of recent science and engineering graduates to determine whether the graduates are staying in science and engineering or shifting to other fields. It especially focuses on

[1] National Academy of Sciences, *Reshaping the Graduate Education of Scientists and Engineers,* Washington, DC: National Academy Press, 1995.

[2] Ibid.

[3] National Science Foundation, *Science and Engineering Indicators, 1998,* Washington, DC: Government Printing Office, 1998.

those students with the best academic records to determine whether they are being retained in science and engineering. The retention of the best students may be an indicator of future accomplishments in science and engineering.

The data presented in this report are from the 1995 National Survey of Recent College Graduates, a national survey of students who graduated with bachelor's or master's degrees in the sciences or engineering in 1992-93 or 1993-94. In this report, the "best" S&E students are identified in terms of their self-reported undergraduate grade point averages (GPAs), with the top students having GPAs ranging from 3.75 to 4.0.[4] Graduates' GPAs are not a perfect indicator of their overall strengths in S&E, but they do measure past success at least within an academic environment. The data here represent relatively short-term retention in science and engineering. No data are available on longer-term retention in S&E, so it is not known whether the patterns noted here would continue (or even be magnified) or be moderated in later years.

GRADUATES' PERCEPTIONS OF THE RELATIONSHIP BETWEEN THEIR WORK AND THEIR EDUCATION

One of the simplest ways of determining whether graduates' work is related to their education is to obtain their own evaluation. This approach addresses the problem that some types of positions that require knowledge of S&E are not necessarily identifiable from the job titles (e.g., if knowledge of S&E is required but is not the principal characteristic of the jobs), while other positions might appear to require an S&E background when in fact that training is not really used in the jobs. In both situations, the graduates may have more accurate responses than otherwise could be obtained.

Table 1 shows that about half (53 percent) of the bachelor's recipients in the highest GPA category who were working said their work was closely related to their degree, and one-fourth (26 percent) said their work was somewhat related. Bachelor's recipients with high GPAs were much more likely to say their work was closely related to their education than those with lower GPAs (53 percent for students with 3.75 or higher versus 33-41 percent for students in lower GPA categories). They were also less likely to say their work was not at all related to their education (21 percent versus 29-36 percent).

[4] The question wording was: "Using a 4-point scale, what was your overall UNDERGRADUATE grade point average (GPA)?" The response categories were: 3.75 – 4.00 GPA (Mostly A's), 3.25 – 3.74 GPA (About half A's/half B's), 2.75 – 3.24 GPA (Mostly B's), 2.25 – 2.74 GPA (About half B's/half C's), 1.75 – 2.24 GPA (Mostly C's), 1.25 – 1.74 GPA (Aboutc half C's), less than 1.25 (Mostly D's or below), and Have not taken courses for which grades were given. Thus, when schools did not use a 4-point scale, graduates were expected to convert their GPAs so that all responses would be comparable.

Among master's recipients the differences were smaller because a majority of master's recipients said their work was closely related to their degree. Still, those in the highest *undergraduate* GPA category were the most likely to say that their work was closely related to their degree (74 percent versus 65-68 percent).[5] Only 7-10 percent said the work was not related to their degree, regardless of their GPA.

Table 1. The relationship between recent science and engineering (S&E) graduates' degrees and their work, by graduates' undergraduate GPA and degree level

Undergraduate GPA	Number of graduates	Relationship between work and education		
		Closely related	Somewhat related	Not related
Bachelor's, total	582,980	39%	30%	31%
3.75-4.0	63,747	53	26	21
3.25-3.74	188,494	41	31	29
2.75-3.24	249,008	37	30	33
Less than 2.75	81,730	33	31	36
Master's, total	127,659	68	23	8
3.75-4.0	28,863	74	20	7
3.25-3.74	49,517	68	24	8
2.75-3.24	39,192	65	25	9
Less than 2.75	10,087	67	23	10

NOTES: The S&E degrees were earned in 1992-93 or 1993-94. This table is based on graduates' own evaluation of the relationship between their degrees and their work. It excludes the unemployed and those who are in school without also being employed. Percents may not add to 100 because of rounding.

SOURCE: National Science Foundation/Division of Science Resources Studies, National Survey of Recent College Graduates: 1995.

A BROADER DEFINITION OF THE RELATIONSHIP BETWEEN WORK AND EDUCATION

Though recent graduates' own evaluation of the relationship between their work and their education is useful, self-evaluation is not without weakness. There may be some bias if graduates try to give more socially acceptable answers, or if their own desire is to believe their education was important in their job. They also may give answers that are inconsistent, either with other

[5] Master's students were only asked about their undergraduate GPA, not their GPA while in graduate school. Thus the top students are here determined based on their undergraduate records.

graduates who have similar jobs but give different evaluations, or with the Standard Occupation Classification (SOC) system, which may treat some occupations differently than what graduates reported.[6] For this reason, the relationship between work and training is also examined here using a classification system developed by NSF. Graduates were asked to provide a general description of their work and to classify their work using a job code list; all the relevant information was reviewed by trained coders to determine the best occupational code to achieve consistency across all graduates. In this report, the analysis of retention in S&E does not distinguish between teaching S&E at the postsecondary level and other employment in S&E. Teaching at the elementary and secondary levels is not included in this analysis.[7]

This second approach also broadens the analysis by accounting for graduates who were still in school at the time they were surveyed. Especially among the graduates with the highest GPAs, remaining in school was fairly likely (32 percent of the top bachelor's recipients, and 36 percent of the top master's recipients). Such students, if they were not employed, were not asked about the relationship between their work and education, yet the area of their continued studies provides valuable information about whether they remained in an S&E field after receiving an S&E degree. Even for students who were both employed and continuing their education, the field being studied probably provides better information about the students' long-term plans to stay in or leave science and engineering than does their area of employment. (Such graduates may not yet have had the credentials required to obtain their desired employment, and their employment may reflect only the need to finance their education and other expenses rather than reflecting long-term career goals.)

Using this more comprehensive measure, about three-fifths of even the top bachelor's recipients were no longer in S&E, or at least not yet established in S&E (table 2).[8] Nevertheless, there continued to be a strong relationship

[6] For example, NSF's occupation classification system excludes the medical professions from S&E, while many recent graduates may not.

[7] S&E degree recipients that obtain employment in teaching is worthy of analysis but more appropriately handled in a separate presentation that focuses only on that group of graduates.

[8] Note that tables 1 and 2 are not directly comparable due to different classification schemes and denominators. Table 1 might appear to show a much larger percentage being retained in science (e.g., for those with the highest undergraduate GPAs, 53 percent versus 40 percent if one adds the first three columns in table 2). However, table 1 excludes the unemployed, who compose at least 19 percent of the bachelor's recipients with the highest GPAs, plus some graduates from the first and fourth columns of table 2. For this table, a student is considered to have remained in the same discipline if he/she either was in school studying the same discipline, or not in school and employed in the same discipline.

between retention in science and engineering fields and students' undergraduate GPAs. The best-performing bachelor's recipients were the most likely to be continuing their education in science or engineering (21 percent versus 6 and 14 percent), and the least likely to be neither in school nor in a science-related or engineering-related job (33 percent versus 41 and 57 percent). Perhaps surprisingly, they also were more likely to be neither employed nor in school than bachelor's recipients with GPAs lower than 3.25 (19 percent versus 8 and 11 percent). The questionnaire data do not provide the reason for this latter finding; it may be that they had greater economic resources (e.g., if they came from families with higher socioeconomic status) so that they had more freedom to wait until they found the employment they desired or entered school, rather than being forced to take other employment while waiting.

Table 2. The employment and education status of science and engineering (S&E) graduates, by graduates' undergraduate GPA and degree level

Undergraduate GPA	Number of graduates	Continuing in S&E		In school, not studying S&E		Not in school, other	
		In school, studying S&E*	Employed in S&E and not in school	Employed in S&E	Employed outside S&E or not employed	Employed outside S&E	Not employed
Bachelor's, total....	697,002	12%	17%	2%	8%	46%	14%
3.75-4.0.....	83,360	21	16	3	8	33	19
3.25-3.74.....	237,282	14	15	3	8	41	18
2.75-3.24.....	287,004	10	18	2	8	51	11
Less than 2.75.....	89,357	6	20	1	8	57	8
Master's, total.....	145,493	22	41	2	2	25	7
3.75-4.0.....	33,642	32	37	3	1	21	6
3.25-3.74.....	56,692	23	41	3	2	24	7
2.75-3.24.....	43,899	17	43	2	2	30	8
Less than 2.75.....	11,260	12	46	3	2	29	8

*Includes graduates who are employed, whether or not the employment is in S&E, as long as they are studying S&E in school. This definition is based on the assumption that the field being studied in school is a better indicator of future career plans than the current employment.

NOTES: The S&E degrees were earned in 1992-93 or 1993-94. Unlike table 1, this table includes graduates who were not employed, and those in school without being employed. Retention in S&E is measured through job codes rather than through graduates' own evaluations. Percents may not add to 100 because of rounding.

SOURCE: National Science Foundation/Division of Science Resources Studies, National Survey of Recent College Graduates: 1995.

About two-thirds of the master's recipients with the highest undergraduate GPAs were still in science or engineering. Master's recipients were even more likely to still be studying science or engineering in school, and the top students again were the most likely to do so (32 percent versus 12-23 percent).

RETENTION IN SPECIFIC DISCIPLINES

The above definition of retention in S&E includes graduates who may have switched from one S&E discipline to another. Table 3 shows that retention within specific disciplines varied greatly from one discipline to another. The disciplines with the highest retention for bachelor's recipients were engineering (60 percent), computer sciences (42 percent), and the physical sciences (36 percent). By contrast, only 11-16 percent of bachelor's degree recipients in mathematics, the biological sciences, and the social and behavioral sciences stayed in the same discipline. There was also substantial variation among master's recipients, though master's recipients were much more likely to stay in the same discipline. The lowest retention rate for master's recipients (37 percent for the biological sciences) was well above the lowest rates for bachelor's recipients (11-16 percent).

Table 3. Detailed correspondence between S&E major and continuing education or employment in S&E for all S&E graduates and for top S&E graduates, by degree level

S&E major	All graduates				Top graduates			
	Number of graduates	In same field	In another S&E field	In non-S&E field	Number of graduates	In same field	In another S&E field	In non-S&E field
Bachelor's, total	698,238	23%	6%	71%	83,360	30%	6%	64%
Computer sciences	38,743	42	6	52	5,268	47	5	49
Mathematics	30,381	12	18	70	4,692	18	33	49
Biological/life sciences	121,060	16	6	78	14,753	21	1	78
Physical sciences	33,169	36	17	47	5,680	44	16	40
Social/behavioral sciences	356,580	11	3	86	40,803	21	3	76
Engineering	118,305	60	11	29	12,163	65	9	26
Masters', total	146,282	53	10	37	33,642	58	11	31
Computer sciences	17,153	62	9	29	4,272	71	5	23
Mathematics	7,157	44	18	38	2,411	55	14	32
Biological/life sciences	14,992	37	10	53	2,144	45	16	39
Physical sciences	9,675	60	16	24	2,675	64	17	19
Social/behavioral sciences	50,738	42	3	55	10,981	48	3	49
Engineering	46,568	67	16	17	11,159	65	19	17

NOTES: The S&E degrees were earned in 1992-93 or 1993-94. Percents may not add to 100 because of rounding.

SOURCE: National Science Foundation/Division of Science Resources Studies, National Survey of Recent College Graduates: 1995.

Overall, the top bachelor's recipients (in terms of GPA) were more likely to stay in the same field than were students in general (30 percent versus 23 percent). There was little difference between the top graduates and all graduates in changing disciplines but staying within science and engineering (6 percent for both groups). In general, graduates who did not stay in the same field switched to non-S&E fields rather than to other fields in S&E. The top master's recipients were like the top bachelor's recipients in being more likely to remain in the same field than master's recipients in general (58 percent versus 53 percent). Because fewer cases were available for analysis within the individual fields, these patterns that were statistically significant overall were not significant when looking at individual fields.

Additional information about where graduates went if they left their discipline is provided in table 4. Among bachelor's recipients, those with mathematics majors were spread out among other S&E disciplines, with 4-14 percent in each discipline listed. Computer sciences and engineering showed some overlap, with 5 percent of computer sciences majors in the field of engineering, and 8 percent of engineering majors in the field of computer sciences. Otherwise, except for some physical sciences majors located in the biological sciences or engineering, bachelor's recipients were largely concentrated either in their original discipline or in fields outside of S&E. Master's recipients showed a similar pattern, except that higher percentages remained in S&E and in their original disciplines.[9]

REASONS FOR LEAVING SCIENCE AND ENGINEERING

Those graduates who were employed outside of the area of their highest degree were asked the reasons why they were in a different field, and to choose the most important reason.[10] Among bachelor's recipients, the three reasons most often named as the most important were the same for top graduates as for other graduates, but there were some differences in how often those reasons were cited (table 5). Bachelor's recipients with the highest GPAs were about equally likely as other graduates to say that pay or promotion was the main reason (23 percent versus 22 and 27 percent), but somewhat less likely to say a job in the degree field was not available (21 percent versus 29 and 37 percent).

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[9] The only exception is that an equivalent percentage of engineering master's recipients stayed in engineering as among engineering bachelor's recipients (65 percent). The remaining differences between master's recipients and bachelor's recipients were all statistically significant.

[10] This question was asked only of those with jobs, and thus does not apply to students who were still in school and not employed. Because relatively few people answered this question (they had to have a job and it had to be in a different field), this analysis looks only at the overall results and not at specific S&E fields.

Table 4. Detailed correspondence between S&E major and continuing education or employment in S&E for top students in S&E graduates, by degree level

S&E major	Number of graduates	Pursuing graduate education or employed							
		In science or engineering							Outside of S&E[2]
		Total[1]	Com-puter sciences	Mathe-matics	Biological/ life sciences	Physical sciences	Social/ behavioral sciences	Engineer-ing	
Bachelor's, total	83,360	36%	6%	1%	4%	4%	11%	11%	64%
Computer sciences	5,268	51	47	0	0	0	0	5	49
Mathematics	4,692	51	14	18	4	6	4	5	49
Biological/ life sciences	14,753	22	*	0	21	1	*	*	78
Physical sciences	5,680	60	2	1	5	44	*	7	40
Social/ behavioral sciences	40,803	24	2	0	*	*	21	1	76
Engineering	12,163	74	8	*	0	*	*	65	26
Masters', total	33,642	69	15	4	4	6	16	23	31
Computer sciences	4,272	77	71	0	0	0	0	5	23
Mathematics	2,411	68	7	55	1	2	*	4	32
Biological/ life sciences	2,144	61	1	0	45	9	1	4	39
Physical sciences	2,675	81	4	1	9	64	0	3	19
Social/ behavioral sciences	10,981	51	1	*	1	*	48	0	49
Engineering	11,159	83	16	*	1	1	0	65	17

*Rounds to zero.

[1]Includes graduates employed in natural sciences with no further specialization. Because of the small number of such graduates,they are not reported separately.

[2]Includes graduates who were neither employed nor in school as well as those who were employed or in school outside of S&E.

NOTES: The S&E degrees were earned in 1992-93 or 1993-94. Percents may not add to 100 because of rounding.

SOURCE: National Science Foundation/Division of Science Resources Studies, National Survey of Recent College Graduates: 1995.

Table 5. Most important reason for working outside of highest degree field, by graduates' undergraduate GPA and degree level

Undergraduate GPA	Number of graduates working outside of degree field	Most important reason						
		Pay/ promotion oppor-tunities	Working conditions	Job location	Change in interest	Family-related	Job in field not available	Other
Bachelor's, total	179,439	26%	9%	10%	14%	5%	31%	5%
3.75-4.0	13,301	23	14	11	18	10	21	4
3.25-3.74	54,081	26	11	10	14	5	29	5
2.75-3.24	82,278	27	8	9	12	5	33	6
Less than 2.75	29,779	22	8	11	15	2	37	5
Masters', total	10,629	20	9	6	14	8	37	5
3.75-4.0	1,907	12	8	11	18	8	42	1
3.25-3.74	4,034	16	10	7	18	8	36	6
2.75-3.24	3,710	27	10	2	10	9	33	8
Less than 2.75	978	29	1	7	9	5	49	1

NOTES: The S&E degrees were earned in 1992-93 or 1993-94. Percents may not add to 100 because of rounding.

SOURCE: National Science Foundation/Division of Science Resources Studies, National Survey of Recent College Graduates: 1995.

The top-performing master's recipients were much more likely than the top bachelor's recipients to say the most important reason for working outside the S&E field was that a job in that field was not available (42 percent versus 21 percent). However, this is not because master's recipients had more difficulty finding jobs, but because they were less likely to leave for other reasons. Table 2 showed that the top master's recipients were more likely than the top bachelor's recipients both to be studying S&E in school (32 percent versus 21 percent) and to be employed in S&E (37 percent versus 16 percent). Thus, the percentage who said an S&E job was unavailable is based on a relatively smaller group of graduates for master's recipients. If one instead calculates the percentage based on all graduates (not just those who left S&E), the percentage who left because of the unavailability of a job was about the same among master's recipients (42 percent of the 21 percent shown in Table 2, or about 9 percent) as among bachelor's recipients (21 percent of 33 percent, or about 7 percent).

SUMMARY

At the time of the survey, most bachelor's recipients in science and engineering were not in S&E-related jobs or education. The students with the best undergraduate records, however, were more likely to have remained in S&E than other students. They were especially more likely to be continuing their education by pursuing graduate degrees in S&E fields. The primary reasons that they took jobs in other fields were because jobs were not available in their degree field, they received better pay or promotion opportunities, or they changed their career or professional interests.

Most master's recipients were continuing in S&E-related employment or education, even among those with the lowest undergraduate GPAs. Master's recipients with high undergraduate GPAs were much more likely than other master's recipients to stay in S&E fields. The primary reason that master's recipients were not employed in S&E was because jobs were not available in the area of their degrees.

Survey Methodology and Data Reliability

The 1995 National Survey of Recent College Graduates (NSRCG:95) is sponsored by the National Science Foundation (NSF), Division of Science Resources Studies (SRS). The NSRCG is one of three data collections covering personnel in science and engineering, which constitute the NSF's Scientists and Engineers Statistical Data System (SESTAT). Further information about the design, implementation, and results of the NSRCG:95 can be found in the *1995 National Survey of Recent College Graduates Methodology Report*.

The NSRCG used a two-stage sample design. In the first stage, a stratified nationally representative sample of 275 institutions was selected with probability proportional to size. Each sampled institution was asked to provide lists of graduates for sampling. The second stage of the sampling process involved selecting graduates within the sampled institutions by cohort. Eligible graduates were those who received bachelor's or master's degrees in the sciences and engineering from July 1992 through June 1994. Oversampling was employed to improve estimates for black, Hispanic, and Native American graduates. The overall sample size of graduates was 21,000.

The unweighted response rate for institutions was 97 percent, and the unweighted response rate for graduates was 86 percent. The weighted response rates were 97 and 83 percent, respectively. Thus, the net weighted response rate for the 1995 NSRCG was 81 percent, the product of rates at each stage of data collection. Interviews were completed for 16,340 graduates. The NSRCG:95 data were weighted to produce national estimates. The item nonresponse for this study was very low (typically about 1 percent) due to the use of CATI technology for data collection and data retrieval techniques for missing key items. However, imputation for item nonresponse was performed using a "hot-deck" method.

Different S&E fields were sampled at different rates, so weights were used to provide nationally representative estimates. The weights accounted both for the probability of selection and for survey nonresponse.

Standard errors for the survey were computed using a replication method known as jackknife replication. Tests of significance used in the analysis were based on Student's ***t***. A Bonferroni adjustment was used to correct significance tests for multiple comparisons. The adjustment varied depending the on the number of multiple comparisons involved (i.e., the number of categories in the specific questions examined, and the nature of the hypothesis being tested). Statements of differences in the text are significant at the 95 percent confidence level after the Bonferroni adjustment.

Table 1a. Standard errors for table 1: The relationship between recent science and engineering (S&E) graduates' degrees and their work, by graduates' undergraduate GPA and degree level

Undergraduate GPA	Number of cases	Relationship between work and education		
		Closely related	Some-what related	Not related
Bachelor's, total.....	9,460	0.68	0.56	0.84
3.75-4.0.....	931	1.89	1.60	1.60
3.25-3.74.....	2,892	1.27	1.19	1.19
2.75-3.24.....	4,133	1.11	0.96	1.32
Less than 2.75.....	1,504	1.71	1.79	1.74
Master's, total.....	4,718	0.72	0.64	0.43
3.75-4.0.....	1,001	1.60	1.43	0.68
3.25-3.74.....	1,810	1.21	1.00	0.83
2.75-3.24.....	1,507	1.36	1.33	0.78
Less than 2.75.....	400	2.57	2.73	1.77

SOURCE: National Science Foundation/Division of Science Resources Studies, National Survey of Recent College Graduates: 1995.

Table 2A. Standard errors for table 2: The employment and education status of science and engineering (S&E) graduates, by graduates' undergraduate GPA and degree level

Undergraduate GPA	Number of cases	Continuing in S&E		In school, not studying S&E		Not in school, other	
		In school, studying S&E*	Employed in S&E and not in school	Employed in S&E	Employed outside S&E or not employed	Employed outside S&E	Not employed
Bachelor's, total...	11,091	0.41	0.46	0.16	0.36	0.59	0.48
3.75-4.0.....	1,195	1.90	1.28	0.60	1.15	2.03	1.68
3.25-3.74.....	3,536	0.72	0.68	0.35	0.57	1.22	0.96
2.75-3.24.....	4,702	0.54	0.85	0.22	0.53	0.81	0.65
Less than 2.75.....	1,658	0.74	1.25	0.33	0.94	2.01	0.94
Master's, total.....	5,390	0.79	1.21	0.27	0.24	0.89	1.16
3.75-4.0.....	1,175	2.01	2.01	0.61	0.36	1.56	0.82
3.25-3.74.....	2,077	1.07	1.58	0.46	0.40	1.20	1.53
2.75-3.24.....	1,691	1.12	1.70	0.36	0.36	1.44	1.56
Less than 2.75.....	447	1.81	2.80	0.90	0.93	3.26	1.77

*Includes graduates who are employed, whether or not the employment is in S&E, as long as they are studying S&E in school. This definition is based on the assumption that the field being studied in school is a better indicator of future career plans than the current employment.

SOURCE: National Science Foundation/Division of Science Resources Studies, National Survey of Recent College Graduates: 1995.

Table 3A. Standard errors for table 3: Detailed correspondence between S&E major and continuing education or employment in S&E for all S&E graduates and for top S&E graduates, by degree level

S&E major	All graduates				Top graduates			
	Number of cases	In same field	In another S&E field	In non-S&E field	Number of cases	In same field	In another S&E field	In non-S&E field
Bachelor's, total	11,109	0.57	0.29	0.58	1,195	1.92	0.80	1.86
Computer sciences	574	2.54	1.02	2.43	73	6.79	2.57	6.96
Mathematics	525	1.45	1.79	2.44	71	4.49	7.04	7.18
Biological/ life sciences	1,500	1.31	0.74	1.56	149	4.81	0.49	4.83
Physical sciences	1,166	1.83	1.10	1.83	180	4.69	3.09	4.25
Social/ behavioral sciences	4,038	1.05	0.30	1.02	409	3.90	0.96	3.94
Engineering	3,306	1.23	0.72	1.13	313	2.81	2.02	2.71
Masters', total	5,414	1.07	0.65	1.18	1,175	1.72	1.06	1.69
Computer sciences	350	2.58	1.61	2.51	86	4.80	2.66	4.35
Mathematics	299	3.21	2.29	3.06	100	4.82	3.93	4.84
Biological/ life sciences	655	4.87	2.14	6.04	86	5.78	4.52	4.91
Physical sciences	764	1.75	1.58	1.43	190	3.84	2.73	3.12
Social/ behavioral sciences	1,582	1.64	0.51	1.55	336	3.84	0.79	3.86
Engineering	1,764	1.56	1.28	0.99	377	3.09	2.56	2.20

SOURCE: National Science Foundation/Division of Science Resources Studies, National Survey of Recent College Graduates: 1995.

Table 4A. Standard errors for table 4: Detailed correspondence between S&E major and continuing education or employment in S&E for top students in S&E graduates, by degree level

S&E major	Number of cases	Pursuing graduate education or employed							
		In science or engineering							Outside of S&E[2]
		Total[1]	Com-puter sciences	Mathe-matics	Biological/ life sciences	Physical sciences	Social/ behavioral sciences	Engineer-ing	
Bachelor's, total	1,195	1.86	0.80	0.29	0.90	0.47	2.27	1.00	1.86
Computer sciences	73	6.96	6.79	0.00	0.00	0.00	0.00	2.57	6.96
Mathematics	71	7.18	4.68	4.49	3.64	2.68	2.22	2.91	7.18
Biological/ life sciences	149	4.83	2.74	0.00	4.81	0.39	0.01	0.06	4.83
Physical sciences	180	4.25	0.96	0.62	1.94	4.69	0.44	1.86	4.25
Social/ behavioral sciences	409	3.94	0.80	0.00	0.17	0.00	3.90	0.54	3.94
Engineering	313	2.71	1.94	0.26	0.00	0.46	0.31	2.81	2.71
Masters', total	1,175	1.69	1.30	0.51	0.59	0.63	1.60	1.45	1.69
Computer sciences	86	4.35	4.80	0.00	0.00	0.00	0.00	2.66	4.35
Mathematics	100	4.84	2.48	4.82	1.05	1.33	0.54	1.93	4.84
Biological/ life sciences	86	4.91	1.29	0.00	5.78	3.05	1.34	3.22	4.91
Physical sciences	190	3.12	1.67	0.60	2.32	3.84	0.00	1.41	3.12
Social/ behavioral sciences	336	3.86	0.42	0.33	0.54	0.21	3.84	0.00	3.86
Engineering	377	2.20	2.62	0.13	0.51	0.42	0.00	3.09	2.20

[1]Includes graduates employed in natural sciences with no further specialization. Because of the small number of such graduates,they are not reported separately.

[2]Includes graduates who were neither employed nor in school as well as those who were employed or in school outside of S&E.

SOURCE: National Science Foundation/Division of Science Resources Studies, National Survey of Recent College Graduates: 1995.

Table 5A. Standard errors for table 5: Most important reason for working outside of highest degree field, by graduates' undergraduate GPA and degree level

Undergraduate GPA	Number of cases	Most important reason						
		Pay/ promotion oppor-tunities	Working conditions	Job location	Change in interest	Family-related	Job in field not available	Other
Bachelor's, total	2,454	1.22	0.81	0.72	0.94	0.51	1.09	0.59
3.75-4.0	151	4.21	3.38	3.22	3.95	3.20	3.85	1.66
3.25-3.74	683	2.67	1.40	1.29	1.54	0.95	2.28	1.07
2.75-3.24	1,148	1.60	1.07	1.19	1.39	0.75	1.59	0.98
Less than 2.75	472	2.66	1.63	1.86	1.86	0.81	2.81	1.32
Masters', total	421	2.50	1.72	1.28	1.95	1.79	2.87	1.34
3.75-4.0	80	4.65	3.37	3.71	4.69	3.83	6.40	1.00
3.25-3.74	151	3.25	3.22	2.47	3.62	2.86	4.20	2.52
2.75-3.24	146	4.23	3.16	1.35	2.69	3.09	3.86	2.79
Less than 2.75	44	8.39	0.54	3.44	5.18	4.63	9.71	0.89

SOURCE: National Science Foundation/Division of Science Resources Studies, National Survey of Recent College Graduates: 1995.